

YEAR 1908

Nine storms were found to have occurred in 1908. Tracks for these storms are presented in Fig. 4.

It should be noted that 1908 exhibited the characteristic of apparently being the only one on record showing two hurricanes in the Atlantic hurricane before Jun. 1.

Storm 1, 1808 (Mar. 6-9), H.

The following information was found in relation to this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Mar. 6, ship near 25.5 N., 58 W., S.E. f. 8, 29.91; ship near 24.5 N, 64 W., N. f. 9, 29.94; ship near 22.8 N., 54 W., S.S.E. f. 6; ship near 18.5 N., 61 W., N.N.W. f. 3; ship near 15.5 N., 58 W., W. f. 3; San Juan, N. f. 5, 29.98; Mar. 7, ship near 19 N., 60 W., S.W. f. 7; San Juan, N. f. 4, 30.01; Martinique, S.S.E. f. 4, 29.92. Mar. 8, San Juan, N.E. f. 6, 29.92; ship near 17 N., 66 W., N.E. f.3, 29.91; ship near 16 N., 60 W., S.E. f. 5, 30.06 (probably too high); ship near 15 N., 60 W., S.E. f. 4, 29.91; Martinique, S.E. f. 6. 29.93. Mar. 9, San Juan, E. f. 6, 30.08; ship near 17 N., 65 W., E. f. 7; ship near 16 N., 62 W., E.N.E. f. 2; Martinique, N. f. 6, 30.00; ship near 16 N., 60 W., E.N.E. f. 6 (Historical Weather Maps, Mar. 1908). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 2) Data extracted from an article by John T. Quin, St. Croix, Danish West Indies, May 20, 1908: The St. Christopher Advertiser (a newspaper published at St. Kitts) on Mar. 10 contained a list of about 24 sloops and boats that had been driven ashore in the early morning of Mar. 8 and been either entirely destroyed or badly damaged. The storm was at its height there at 2 A.M. (Mar. 8), when the barometer at Basseterre (St. Kitts) stood at 29.28 inches. In regard to the rainfall from this disturbance, we learn from reports of Mr. Shepherd that in the N. of St. Kitts the fall was 8 inches, at Basseterre it was 4 inches and in Nevis (an island a few miles S.E. of St. Kitts) it was 3 inches. It became possible to say just where the cyclone center had passed through the Caribbean chain of islands (while moving roughly on a S.W. course), namely between St. Christopher on the S.E. and St. Eustatius on the N.W. This is manifest from the fact that at St. Christopher and Nevis all the small craft lying on the westward or lee side of the islands were driven ashore while at St. Eustatius the vessels (also on the lee side) were driven out to sea. A schooner navigated by the mate and a couple of hands arrived at St. Thomas, and reported having been driven off from St. Eustatius by the storm, and "a Curacao sloop named the "Sea Hawk" was picked up off Arroyo (Puerto Rico) on Mar. 20, abandoned and stripped of mast and sails", and subsequently it turned out that the sloop had broken away from her anchorage at St. Eustatius during the storm, all hands being on shore at the time. Before reaching the channel between St. Eustatius and St. Kitts, the center had passed near to St. Bartholomew, where some damage was done to buildings, among others to the Anglican Church. In St. Martin considerable damage was done to the tents of the peasants and to the cotton crop. The news from that island contained information that the wind went around through E., showing that St. Martin was on the N.W. side of the storm. At Antigua, away from the center to the eastward, the barometer stood at 29.62 inches at 2 A.M. (Mar. 8); at St. Thomas the lowest barometer was 29.80 inches at 3 A.M. and at St. Croix it was 29.83 inches at 4 A.M. The "Barbadian" reached St. Thomas from Liverpool in the morning of Mar. 7 and reported having encountered a S.W. gale on Mar. 5 changing to a S.W. gale on Mar.6. The schooner "Hattie C. Luce", which arrived at St. Thomas on Mar. 10, reported having met with a

hurricane in the neighborhood of Sombrero, with the consequent loss of some of her sails. The steamship "Parima" of the Quebec Line, arriving at St. Thomas on Mar 7, reported bad weather "all the way out" (Monthly Weather Review, May 1908). 3) St. Thomas, Mar. 9. A heavy gale visited St. Kitts on Saturday night (Mar. 7), accompanied by torrential rains. Small craft were driven ashore, and the crops were seriously damaged (The times, London, Mar. 10, 1908, p.5, col.4). 4) Paris, Mar. 24. A telegram from Basse Terre (Guadeloupe) states that the islands of St. Martin and St. Barthelemy have been devastated by storms . The Governor M. Ballot has sent assistance from Basse Terre (The Times, London, Mar. 26, 1908, p.5, col.5).

Information contained in the above items was found to support, in general, the track for Storm 1, 1908 which is displayed in Neumann et al. (1993). Therefore, the author of this study decided to reproduce such a track in Fig. 4.

The lowest barometer reading of 29.28 inches at Basseterre, St. Kitts (item 2), apparently taken outside the center of the storm, was found to support hurricane intensity, confirming the hurricane status which Neumann et al. (1993) gave to this off-season storm.

Although a rare event in the Leeward Islands for Mar., this off-season storm is not unique in that area since a second hurricane known as "Alice" visited the same islands on Jan. 2, 1955.

Storm 2, 1908 (May 24-31), H.

This storm is not included in Neumann et al. (1993) and from this point of view it can be considered as a new case. However, the storm has been mentioned before as a tropical system in the literature. Ortiz-Hector (1975) mentioned the case as an off-season tropical storm of great intensity, Historical Weather Maps (May 1908) clearly showed its evolution and The New York Times announced its presence by publishing corresponding advices issued by the Weather Bureau and ship reports filed by captains. Even tracks for this storm were presented in Ortiz-Hector (1975) and the Monthly Weather Review (May 1908). Therefore, the author of this study has just investigated the case and decided to incorporate it to the storms of 1908.

Documentation of this storm was based on the following information: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: May 24, Turks Is., E.S.E. f. 2, 29.92; Port-au-Prince, S.W. f. 1, 29.86; ship near 23 N., 74 W., N.N.E. f. 4 (or 6), 29.97; ship near 26 N., 75 W., N.N.E. f. 5; ship near 27 N., 72 W., E.N.E. f. 5. May 25, ship near 25 N., 77 W., N.N.E. f. 4; Turks Is., S. f. 4, 30.01; ship near 29 N., 74 W., N.E. f. 6, 30.08; ship near 21 N., 74 W., S.W. f. 2, 29.88; center near 24 N., 73.5 W. inferred from curvature of isobars. May 26, ship near 26 N., 74 W., S.S.W. f. 7; ship near 28 N., 75.7 W., E.N.E. f. 6, 29.77; ship near 29 N., 77.7 W., N.N.E. f. 6, 29.94; Jupiter, N.N.W. f. 3, 29.89; center placed 26.5 N., 77 W., but around 27 N., 76 W. seems to be a better location. May 27, Jupiter, W. f. 3, 29.88; Jacksonville, N.N.W. f. 3, 29.87; Charleston, E.N.E. f. 4, 29.88; Wilmington, E. f. 2, 29.94; ship near 32.5 N., 75 W., S.E. f. 5, 29.97; ship near 31.7 N., 74, S.E. f. 4, 29.97; ship near 30 N., 79 W., S.E. f. 6, 29.71; center placed 29.5 N., 79 W., a little far E., 29.5 N., 79.5 W. seems to be a better location. May 28, Jacksonville, N.N.W., f. 2, 29.90; Charleston, N. f. 4, 29.86; Wilmington, E. f. 4, 29.91; Hatteras, S.E. f. 3, 29.97; ship near 31.8 N., 76 W., S.S.E. f. 10 (or 12); ship near 30.8 N., 78.5 W., S.E. f. 11 (ship position is doubtful); center placed 30.7 N., 77.3 W.; however 31.7 N., 78.3 W. looks a much better location. May 29, Charleston, N. f. 3, 29.92; Wilmington, N.W. f. 4 (speed not clearly read off the map; Hatteras, S.E. f. 5, 29.78; ship near 34.8 N., 74 W., E.S.E. f. 7, 29.71 (not clearly read off the map); ship near 33 N., 75 W., S.S.E. f. 10; ship near 30 N., 78 W., S.W. f. 2, 30.00; center placed near 33 N., 75

W.; however, off Cape Lookout appears to be a much better location. May 30, Hatteras, W. f. 4, pressure could not be read; ship near 34.7 N., 73.5 W., W.S.W. f. 9, 29.71; Norfolk, N.W. f. 4, 29.73 (not clearly read); Atlantic City, E. f. 3, 29.75; ship near 34.7 N., 73.5 W., W.S.W. f. 9, 29.71; center placed near 37.2 N., 74 W.; extratropical low over the Great Lakes region. May 31, extratropical low placed 47 N., 71 W.; however, data suggested center was near 45.5 N, 69 W. (Historical Weather Maps, May 1908). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 2) Washington, May 26. The disturbance central Sunday (May 24) near Santo Domingo is now apparently off the E. Florida coast (The New York Times, May 27, 1908, p.12, col.7). Author's note: This and other weather statements published in The New York Times were probably issued the evening before their publication. 3) Washington, May 27, 1908. The tropical disturbance that was sighted near Santo Domingo on Sunday (May 24) has advanced to a position off the South Atlantic coast (The New York Times, May 28, 1908, p.9, col.7). 4) Washington, May 29. The recent tropical disturbance is now central near Hatteras and moving northward, attended by rains (The New York Times, May. 30, 1908, p.10, col.7). 5) Washington, May 30. The tropical storm of the last week was central this evening near New York City (The New York Times, May 31, 1908, p.13, col.7). 6) May 24-31, 1908. Cyclonic perturbation of great intensity was first observed near the Dominican Republic on May 24. During May 25-27 it moved to the N.W. over the seas off the Bahamas. The steamship "Mexico" encountered the storm off the U.S. southeast coast on May 28 (and 29). Her captain stated: "that day (May 28) we had a W.N.W. breeze which lasted until midnight. Starting about 10 P.M., the wind increased in force and continued until 4 A.M. (May 29). From 4 A.M. to noon (May 29), the gale increased to hurricane force, with the wind shifting to W. and heavy showers. The ship hove from 8 A.M. to midday ". The storm passed Cape Hatteras on May 29. At midnight May 29-30, the steamship "Bayamo" in latitude 36.2 N., 74.7 W. registered a lowest pressure of 993.9 millibars (29.35 inches) with strong wind from S.E. to S.W. The storm skirted the east U.S. coast, passed near Eastport, Me., on May 31, and dissipated near the mouth of the St. Lawrence River (Ortiz-Hector, 1975). Author's note: The above publication contains a map showing a track for this storm, starting just N. of the eastern portion of the Dominican Republic on May 24 and ending near Eastport, Me., on May 31. 7) Nassau, Jun. 3. The crew of the schooner "Nara" has arrived here. The "Nara" sank in the Bahama Channel on May 26 (Diario de la Marina, Havana, Jun. 4, 1908, morning edition, p.1, col.2). Author's note: This accident was probably related to the storm but there is no way to ascertain that this was indeed the case. 8) The Ward liner "Mexico" arrived from Havana one day late. She ran into the storm on Friday (May 29), between Cape Lookout and Frying Pan Shoal, and for 26 hours she was running through a gale which tore apart lashings and ripped the fixtures from the deck. Within a few hours the wind, according to Capt. Knight, had attained a velocity of 80 mph. For 5 hours the vessel kept under headway. In the afternoon the "Mexico" buried her nose into an unusually high sea, did not recover in time, and a torrent of water went sweeping over her and tore open the doors leading to the saloon and staterooms. In an instant a flood of water poured into the interior of the vessel. Twenty six stewards were told off to form a bucket brigade and for some time they bailed to keep saloon deck and gang ways clear. The wireless equipment was stripped from the mast and the system crippled. The covers were ripped from the boats, ventilators bent and other minor damage was done (The New York Times, Jun. 1, 1908, p.3, col.3-4). 9) The full force of the storm was felt by the steamer "Camaguey". She arrived from Santiago (de Cuba) and reports to having been through much the same experience as the "Mexico" (The New York Times, Jun. 1, 1908, p.3, col.4). 10) The fruit steamer "Bradford" got in late from Port Antonio. She passed

through the cyclone, and Capt. Oertel reports that at 4 P.M. Saturday (May 30) he passed the schooner "Charles S. Hirsch", from Savannah to this port, apparently disabled (The New York Times, Jun. 1, 1908, p.3, col.4). 11) Chatham, Ma., May 30. An unknown steamer went ashore on Nanslett Beach shortly before 11 P.M. tonight. A S.E. gale is blowing and there is a high sea, making her position a very dangerous one (The New York Times, May 31, 1908, p.1, col.6). 12) Boston, May 31. As a result of the S.E. gale and angry sea along the coast of Southern Massachusetts and Rhode Island last night and this morning two schooners, the "Carrie C. Ware" and the "Belle Halliday", went ashore. It is thought both vessels may be floated after their cargoes are lightened. Their crews remain on board (The New York Times, Jun. 1, 1908, p.3, col.4). 14) Some maximum velocities associated with this storm were as follows: Hatteras, N.W. 54 mph on May 29; Cape Henry, N. 58 mph on May 30; Norfolk, N.W. 40 mph on May 30; Providence, R.I., S.E. 34 mph on May 30; Boston, S.E. 36 mph on May 30 (Monthly Weather Review, May 1908). 14) The minimum pressure recorded at Hatteras was 29.19 inches (Weather Bureau, 1910). Author's note: Indications are that the above value was not corrected to sea level, in which case the sea-level pressure would be higher than indicated. 15) Map showing a track for this storm. The track was started near 20.5 N., 70.5 W. in the morning of May 24, the storm having reached a position near 31 N., 78 W. by the morning of Sept. 28. Then the storm is shown to have turned to the N.N.E. and was placed practically over Cape Hatteras in the evening of May 29, with a central pressure of 29.20 inches. By the evening of May 30, it was placed near the eastern tip of Long Island, N.Y. and near Eastport, Me. by the morning of May 31, at which time the center had merged with an extratropical low that was identified over the Great Lakes region the day before (Monthly Weather Review, May 1908). Author's note: Except in the vicinity of Hatteras, this track was found to be 75-100 miles to the W. of the one published in Ortiz-Hector (1975); both tracks were found to differ very little near Hatteras. On the basis of information contained in the above items, particularly in item 1), the author of this study prepared a track for Storm 2, 1908. 7 A.M. positions along the author's track were as follows: May 24, near 21.0 degrees N., 71.7 degrees W.; May 25, near 24.0 degrees N., 73.5 degrees W.; May 26, near 26.7 degrees N., 76.3 degrees W.; May 27, near 29.5 degrees N., 79.5 degrees W.; May 28, near 31.7 degrees N., 78.3 degrees W.; May 29, near 34.0 degrees N., 76.5 degrees W.; May 30, near 37.3 degrees N., 74.0 degrees W.; May 31, near 45.5 degrees N., 69.0 degrees W. The author's track for this storm is shown in Fig. 4.

On the basis of the lowest pressures of 29.19 and 29.20 inches at Hatteras stated in items 14) and 15), on the wind of 80 mph or hurricane force reported by the steamship "Mexico" (items 6 and 9) and on a possible wind of force 12 read off the morning weather map for May 28 (item 1), the author of this study decided to classify Storm 2, 1908 as a hurricane of minimal intensity. Therefore, the author introduced hurricane intensity along the portion of his track from early May 28 to early May 30. Prior to early May 28 and during most of May 30, tropical storm status was denoted along the author's track. The extratropical stage was introduced in the early morning of May 31.

The storm motion over the Gulf Stream starting on May 27 should have significantly contributed to its intensification to hurricane status, making of this system the second hurricane of 1908 in the Atlantic during the pre-season months of that year. This is apparently a unique event on record since no other year is known to have had two hurricanes prior to the so-called beginning of the hurricane season on Jun. 1.

Storm 3, 1908 (Jul. 24- Aug.3), H.

This storm corresponds to Storm 2, 1908 in Neumann et al. (1993).

The following information was found in relation to this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Jul. 24, Charleston, E. f. 7, 30.09; Jacksonville, N. f. 2, 30.00; Jupiter, W. f. 2, 29.99; ship near 27 N., 79 W., N.N.W. f. 3; ship near 31 N., 78 W., E. f. 7; ship near 32 N., 74 W., E. f. 4, 30.06; ship near 26.7 N., 74.7 W., calm, 29.94; center placed 29 N., 76.5 W., probably too far N. and W., around 27.5 N., 75 W. looks a better position. Jul. 25, ship near 31 N., 78.5 W., E.N.E. f. 6, 30.06; Charleston, E. f. 5, 30.10; Jacksonville, N.E. f. 2, 30.04; Jupiter, W. f. 2, 30.03; ship near 26 N., 78 W., W. f. 1, 29.94; center placed 29 N., 76.5 W. Jul. 26, Charleston, N.E. f. 3, 30.03; Jacksonville, N.N.W. f. 2, 29.96; Jupiter, W. f. 4, 29.94; ship near 26.7 N., 78 W., W. f. 4, 29.94; ship near 31.7 N., 76 W., E. f. 5; center placed 29 N., 77.5 W. Jul. 27, Jacksonville, N.E. f. 3, 29.96; ship near 30 N., 78 W., E. f. 4, 29.86; Charleston, N.E. f. 4, 30.03; ship near 32 N., 77 W., E. f. 5, 30.03, showers; ship near 32 N., 74 W., E.S.E. f. 5, 30.00; ship near 28 N., 79 W., N.E. f. 2, 29.88; Jupiter, W. f. 3, 29.89; ship near 25 N., 76 W., W. f. 4; center placed 29.7 N., 74.7 W., wrong position, near 27.7 N., 78.5 W. seems to be a much better location. Jul. 28, Jupiter, N.N.W. f. 3, 29.80; Jacksonville, N.N.E. f. 3, 29.92, rain; ship near 28 N., 78 W., N.N.E. f. 4, 29.88; ship near 26.5 N., 77.5 W., N.W. f. 6, 29.80; ship near 26 N., 74 W., S. f. 5, 29.91; center placed 28 N., 76.5 W., probably a little far N. and E., near 27.3 N., 77 W. appears to be a better position. Jul. 29, Jacksonville, N. f. 3, 29.89; Charleston, N. f. 2, 30.00; Hatteras, E. f. 3, 30.01; ship near 31 N., 71 W., S.S.E. f. 7, 29.77; ship near 29 N., 80 W., N. f. 7, 29.77; Jupiter, W. f. 3, 29.81; ship near 26 N., 79 W., N.W. f. 6, 29.83; center placed 28.5 N., 76.3 W., too far E., near 29.5 N., 78 W. would be much better. Jul. 30, ship near 33.5 N., 77.8 W., N.E. f. 6, pressure could not be read; Hatteras, E. f. 4, 29.86; Charleston, N.N.W. f. 5, 29.73; ship near 30.8 N., 78.8 W., W. f. 7; Jacksonville, N.N.W. f. 2, 29.93; ship near 34.7 N., 73.7 W., E. f. 10, 29.83; ship near 32.7 N., 72.7 W., S.E. f. 10; center near 32.3 N., 77.5 W., maybe a bit far E. Jul. 31, Wilmington, W. f. 6, 29.59; Hatteras, S. f. 6, 29.64; center on the coast, probably just W. of Cape Lookout (Historical Weather Maps, Jul. 1908). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 2) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 1, ship near 34.3 N., 72.5 W., W.N.W. f. 8, 29.59; Hatteras, N.N.W. speed could not be read, 29.65; ship near 36 N., 70 W., S. f. 7, 29.71; center placed 35.7 N., 73 W., too far W., near 36.5 N., 71.7 W. appears to be a better location. Aug. 2, center placed 39.5 N., 65.5 W., there were some ships around the low but they were quite far from the center. Aug. 3, extratropical low placed near central Newfoundland (Historical Weather Maps, Aug. 1908). Author's note: as indicated before, wind forces (f) are on Beaufort scale and pressures are in inches. 3) A shallow barometric depression advanced from the Caribbean Sea to the Gulf of Mexico from Jul. 21 to Jul. 23. Pressure continued low over the Gulf of Mexico until Jul. 25 when two centers of disturbance began to form, one over the West Gulf and the other near the east coast of Florida. The disturbance in the West Gulf drifted slowly northward over the coast line without developing marked intensity. The disturbance near the Florida coast gradually deepened until Jul. 29 when a northward movement began and on the morning of Jul. 30 a storm of marked intensity was central off the North Carolina coast. During Jul. 30 the depression deepened rapidly and at 4:20 P.M. a reading of 29.18 inches was reported at Wilmington, N.C. and at the regular evening report of that day a reading of 29.22 inches was reported at that station. Storm advices had been sent to Atlantic ports for several days and storm warnings were displayed on Jul. 30 from Wilmington, N.C. to Cape Cod. Based upon the 4:20

P.M. special report hurricane warnings were ordered from Hatteras to Norfolk. During Jul. 31 the center of disturbance moved slowly northward and at the evening report had passed N. of Hatteras where the barometer at the time of the regular evening observation was 29.32 inches. The subsequent course of the storm was N.E. near the Middle Atlantic and New England coasts and it disappeared over Newfoundland the night of Aug. 2 (Monthly Weather Review, Jul. 1908). Author's note: Part of the information above was also published in Tannehill (1938). The statement that Storm 3, 1908 formed from a center associated with the shallow depression which allegedly moved from the Caribbean Sea to the Gulf of Mexico was found to be doubtful. 4) The Evening Metropolis, Jacksonville, Fl., Jul. 30, 1908 commented as follows: The storm that the Weather Bureau has been watching for 3 or 4 days has at last shown itself, and this morning is approaching the coast line near Wilmington, N.C. At 7 A.M. the wind velocity at North Carolina stations was between 40 and 50 mph from the E. and N.E. No doubt the disturbance has been giving some sailing vessels a hard time. The fact that the storm has at no time been near land, and yet located daily with almost absolute accuracy, shows the exactness with which the Weather Bureau makes its predictions. There are a number of vessels that delayed sailing on account of the display of storm warnings, and they now appreciate the wisdom of their conduct... (Weather Bureau, 1910). Author's note: The Monthly Weather Review, Jul. 1908, also published the note which appeared in the Evening Metropolis. 5) The Virginia Pilot, Norfolk, Va., Aug. 2, 1908 remarked as follows regarding warnings issued in connection with this storm: "It was due to the significant work of the Weather Bureau that there were no wrecks along the coast. Many hours before the storm developed any great strength the Bureau sent warnings along the coast to notify mariners that there was a blow off the Florida coast and advised caution about proceeding south. These warnings were sent to several wireless stations, which transmitted them to vessels at sea having the wireless apparatus, so that the news was flashed down the line" (Weather Bureau, 1910). 6) Washington, Jul. 30. The shallow depression that appeared over the Caribbean Sea last week has developed a center of marked strength that is located on the North Carolina coast this evening with reported pressure of 29.22 inches at Wilmington. Hurricane warnings are ordered from Hatteras to Norfolk (The New York Times, Jul. 31, 1908, p.7, col.7). 7) Washington, Jul. 31. The center of the coast storm has advanced to just N. of Hatteras with a barometer reading of 29.32 inches at 8 P.M. and a maximum wind velocity of 42 mph. The future course of this storm will be northerly near the coast line (The New York Times, Aug. 1, 1908, p.7, col.7). 8) Washington, Aug. 1. The coast storm has continued N. and N.E. and is apparently central tonight near the Southeastern New England coast. But little rain has attended this storm during the last 24 hours and high winds occurred at very few places (The New York Times, Aug. 2, 1908, p.7, col.7). 9) Washington, Aug. 2. The Atlantic coast storm has passed beyond the Canadian Maritime Provinces, without unusual incident (The New York Times, Aug. 3, 1908, p.10, col.7). 10) The steamer "Finance", from Panama, reported a strong gale on Friday, Jul. 31 (The New York Times, Aug. 3, 1908, p.5, col.2). 11) The steamer "Madonna", from Naples, buffeted into the storm on Saturday (Aug. 1) when she was 80 miles E. of Nantucket (The New York Times, Aug. 3, 1908, p.5, col.2). 12) The "City of Savannah" left Savannah 3 days ago and for 36 hours she ran into the hurricane. The wind at first came up under her stern but as the storm passed around it came out of the N. She was buffeted by waves which broke against her bow with terrific force (The New York Times, Aug. 3, 1908, p.5, col.2). 13) Some maximum velocities associated with is storm were as follows: Wilmington, N.C., N.E. 48 mph on Jul. 30; Hatterass, N.W. 58 mph on Jul. 31; Cape Henry, 46 mph on Aug. 1 (Monthly Weather Review, Jul. 1908 and Aug. 1908). 14) Minimum pressure at Wilmington (not corrected to sea level) was

29.06 inches and at Hatteras was 29.32 inches (Weather Bureau, 1910). Author's note: Because the barometer was 73 feet above sea level at Wilmington, the correction to sea level was not negligible at that station, resulting in the reading of 29.18 inches indicated in item 2). 15) Map showing a track for this storm as follows: off the Florida coast from the morning of Jul. 25 through the evening of Jul. 29; near 32.5 N., 77.5 W. in the morning of Jul. 30; near 35 N., 75.5 W. in the morning of Jul. 31 and near 35 N., 74 W. in the evening of Jul. 31 (Monthly Weather Review, Jul. 1908). Author's note: Most positions shown along this track were found to be quite inaccurate. This track was apparently continued on a map for the storms of Aug. 1908 (Monthly Weather Review, Aug. 1908), showing a low center near Atlantic City in the morning of Aug. 1 and near Halifax in the morning of Aug. 2, positions which were found to be much too far to the north. 16) A storm was first observed near 22 N., 69 W. on Jul. 27, 1908 and lasted 8 days; it recurved near 29 N., 79 W. and it was last observed near 63 N., 51 W. (Mitchell, 1924). Author's note: A track in Tannehill (1938) was found to be very similar to the one in the publication above. However, the track for this storm (as for Storm 2, 1908) in Neumann et al. (1993) was entirely different, since it was started just E. of Cape Canaveral on Jul. 25, and it described a clockwise loop before turning northward on Jul. 28.

On the basis of information contained in the above items, particularly in items 1) through 3), the author of this study introduced a number of modifications along the storm track shown in Neumann et al. (1993). The author's track was started one day earlier than in the above publication, his 7 A.M. Jul. 24 position being estimated near 27.5 degrees N., 75.0 degrees W., based on a ship observation reporting calm and the lowest pressure for that day in item 1). 7 A.M. positions as estimated by the author for subsequent days were as follows: Jul. 25, near 28.7 degrees N., 76.3 degrees W.; Jul. 26, near 29.0 degrees N., 77.5 degrees W.; Jul. 27, near 27.7 degrees N., 78.5 degrees W.; Jul. 28, near 27.3 degrees N., 77.0 degrees W.; Jul. 29, near 28.5 degrees N., 78.0 degrees W.; Jul. 30, near 32.5 degrees N., 78.0 degrees W.; Jul. 31, near 34.7 degrees N., 77.0 degrees W.; Aug. 1, near 36.5 degrees N., 71.7 degrees W.; Aug. 2, near 39.5 degrees N., 65.5 degrees W.; Aug. 3, near 48.5 degrees N., 56.5 degrees W. Differences between the above positions and the respective ones in Neumann et al. (1993) as for Storm 2, 1908 were found to range from about 225 miles on Aug. 2 to a few miles on Jul. 26 and Jul. 31. It should be mentioned, however, that the confidence the author has in his track is lower prior to Jul. 28 than from that day on. The reason for his low confidence during the early stages is that he believes it could have been possible a sort of reformation of the center to the S.E. instead of the pure motion which is denoted by his loop track. The author's track for Storm 3, 1908 is displayed in Fig. 4.

Although no winds of hurricane intensity were reported in any of the items above, the author of this study decided to keep the hurricane status that Neumann et al. gave to this storm as for Storm 2, 1908; the author's decision was based on the fact that the lowest pressure (corrected to sea level) of 29.18 inches reported at Wilmington, N.C. at 4:20 P.M. Jul. 30 (item 3) was low enough to have supported hurricane winds. Hurricane intensity was introduced along the author's track early on Jul. 30 and prior to that time the storm was kept as a tropical storm in spite of that the author recognizes that that status was likely to be reached over only a portion of the Jul. 24-29 period. The extratropical stage was introduced along the author's track around noon Aug. 2 as the storm passed the 41 N. parallel and moved away from the warm waters of the Gulf Stream.

Storm 4, 1908 (Aug. 30- Sept. 2), T. S.

This is the same storm that Neumann et al. (1993) identify as Storm 3, 1908.

The following information was found about this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 30, Hatteras, N.E. f. 6, 30.10; ship near 34 N., 76 W., N.N.E. f. 6; ship near 31.8 N., 71 W., S.W. f. 4, 30.09, rain; frontal low placed 33 N., 72.5 W. Aug. 31, Hatteras, N.E. f. 4, 30.09; Wilmington, N. f.3, 30.11; ship near 31.8 N., 78 W., N.W. f. 6; ship near 31 N., 76 W., W.S.W. f. 4, 30.09; low placed 33 N., 74 W., a position near 33 N., 76 W. would be much better (Historical Weather Maps, Aug. 1908). Author's note: Wind forces (f) are on Beaufort scale and pressures are in inches. The same is true for item 2). 2) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 1, Hatteras, S.E. f. 3 (speed could not be easily read), 29.90; Wilmington, N.W. f. 4, 30.06; ship near 32.7 N., 77.2 W., W.N.W. f. 5; ship near 32.7 N., 74 W., W. f. 3 (speed could not be easily read); ship near 35.8 N., 74 W., N.W. f. 8, wind direction probably wrong; center 1010 millibars (29.83 inches) placed 33.5 N., 74.5 W. (too far E., center seems to be on the coast S.W. of Hatteras). Sept. 2, ship near 39 N., 71.7 W., N. f. 6, 29.77; Nantucket, S. f.4, 29.91; ship near 36 N., 72.5 W., W.N.W. f. 4, 29.97; ship near 36 N., 69 W., S. f.6, 30.12; center not placed on map, but it could be inferred near 38.5 N., 70.7 W.; cold front which extended from Maine to the S.W. to just W. of New York City was shown on the map. Sept. 3, center was absorbed in the cold front and could not be identified any longer. 3) Washington, Sept. 1. A storm off the coast of North Carolina is causing high winds on the Virginia and North Carolina coasts and rains in Virginia, Delaware and eastern North Carolina (The New York Times, Sept. 2, 1908, p.13, col.6). 4) The maximum wind velocity at Hatteras was W. 45 mph on Sept. 1 (Monthly Weather Review, Sept. 1908). 5) The minimum pressure at Hatteras in Sept. 1908 was 29.80 inches (Weather Bureau, 1910). Author's note: It is very likely that this pressure occurred in connection with this storm. Even if this were not the case, the minimum pressure related to this storm would have been between 29.80 and 29.90 inches, which is quite high. 6) Map showing a track for this storm. The track was started just to the S.W. of Hatteras in the morning of Sept. 1 and the center was placed near 39 N., 70 W. in the morning of Sept. 2, near Portland, Me., in the evening of that day and near the west coast of Newfoundland in the morning of Sept. 3 (Monthly Weather Review, Sept. 1908).

On the basis of information in the above items, the author of this study introduced a number of modifications along the track shown in Neumann et al. (1993) as for Storm 3, 1908. By mostly using information in items 1) and 2), the author estimated his 7 A.M. positions as follows: Aug. 30, near 33.0 degrees N., 72.5 degrees W.; Aug. 31, near 33.0 degrees N., 76.0 degrees W.; Sept. 1, near 35.0 degrees N., 76.3 degrees W.; Sept. 2, near 39.0 degrees N., 70.7 degrees W. The difference between these positions and the corresponding ones in Neumann et al. (1993) was found to range from about 120 miles on Sept. 2 to a few miles on Aug. 30. The author's track for Storm 4, 1908 is shown in Fig. 4.

The maximum wind velocity (5 minute average) of 45 mph reported at Hatteras (item 4) was found to support the tropical storm status given to this system by Neumann et al. (1993) as for Storm 3, 1908. Therefore, tropical storm status was denoted along the author's track for the entire period Aug. 30- Sept. 2, and was changed to the extratropical stage late on Sept. 2, before terminating the track in compliance with information for Sept. 3 in item 2).

Storm 5, 1908 (Sept. 7-19), H.

This storm corresponds to Storm 4, 1908 in Neumann et al. (1993).

The following information was found in relation to this storm: 1) On the morning of Sept. 9 there was evidence of storm formation near the Leeward Islands and during the afternoon and night of that date the center of the disturbance past on a N.W. course near and to the eastward of Puerto Rico. By the morning of Sept. 10 the storm center had advanced to a position N. of Puerto Rico and by the morning of Sept. 11 had past to the westward of Turks Is., where wind velocities estimated at 80 or more miles an hour caused destruction to life and property. Continuing on a N. of W. course during Sept. 12-13, the center of the storm recurved N. on Sept. 14 and past to the eastward of Nassau, Bahamas. From this region the disturbance moved N.E. between Bermuda and the American coast during Sept. 15-16, past S. of the Canadian Maritime Provinces during Sept. 17 and disappeared east of Newfoundland after Sept. 18, and apparently merged into an extensive area of low barometer that extended southward from Iceland. The exceptional severity of the storm during its westward passage over the Bahamas and attending the subsequent N.E. course over the Atlantic is shown by reports of vessels that were caught within the vortex (Monthly Weather Review, Sept. 1908). Author's note: The above material was extracted from an article by E.B. Garriott. 2) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 7-8, storm center could not be easily identified, some S. winds were reported to the S.E. of Barbados. Sept. 9, ship near 16 N, 61.2 W., N.N.W. f. 3, 29.88, rain; Dominica, S. speed was not given but very light; ship near 14 N., 60 W., S.S.W. f. 3; ship near 13 N., 58.7 W., S.W. f. 3, 29.88; center not placed on map, but probably near 16.3 N., 60 W. Sept. 10, San Juan, W.S.W. f. 5, 29.74; ship near 20.7 N., 67 W., N.E. f. 8; ship near 17.8 N., 67 W., N.N.W. f. 6, 29.90; center placed 19.5 N., 66.7 W. Sept. 11, Cap Haitien, N.N.W. f. 8, 29.38, rain; Turk Is., S.E. f. 10, 29.78; Santo Domingo, S.W. f. 6; Port-au-Prince, E. f. 2, 29.75; ship near 19 N., 74 W., N.N.W. f.4, rain; center just off Cap Haitien, probably near 20.3 N., 72 W. Sept. 12, no data near center; center placed on the northern Cuban coast near 75 W. (too far S.). Sept. 13, ship near 21 N., 74 W., S.S.W. f. 4, 29.56; ship near 25 N., 74.2 W., E. f. 5 (speed not easily read), rain; ship near 26 N., 78 W., N.N.E. f. 6, 29.65; ship near 27 N., 71 W., S.E. f. 7, 29.77; Jupiter, N.E. f. 4, 29.78; center placed 24.2 N., 74.2 W. (too far E., near 24 N., 76 W. would be much better. Sept. 14, ship near 28 N., 73 W., E. f. 7, 29.59; ship near 26 N., 75 W., N.W. f. 7, 29.44; ship near 22 N., 73.8 W., S.W. f. 4, 29.65; Jupiter, N. f. 3, 29.70; center placed 26.7 N., 74.2 W. Sept. 15, ship near 31 N., 71 W., E.N.E. f. 11, 29.32; ship near 32 N., 70 W., E. f. 8, 29.62; ship near 30 N., 66 W., S.S.E. f. 9; ship near 27.7 N., 65 W., S. f. 7; ship near 25 N., 74 W., W.N.W. f. 5, 29.74; center placed 29.2 N., 69.7 W. (too far E., around 30 N., 71 W. seems to be better). Sept. 16, ship near 38 N., 66 W., E.N.E. f. 12, 29.91; ship near 33.7 N., 67.8 W., N.E. f. 10; ship near 33.7 N., 70 W., N.N.W. f. 10; ship near 31 N., 70 W., N.W. f. 6, 29.77; ship near 30 N., 67 W., W.S.W. f. 5; ship near 29 N., 63 W., S.S.W. f. 4, 29.83; ship near 31 N., 61 W., S.S.W. f. 6; center placed 33.5 N., 65.5 W. (too far E., near 33.5 N., 67.5 W. would be a much better position). Sept. 17, ship near 40 N., 66 W., N.N.E. speed could not be read; ship near 39.8 N., 63.5 W., S.S.W. f. 9; other data difficult to read; center placed 39.7 N., 65.2 W., probably a bit N. and W. Sept. 18, ship near 43.7 N., 60 W., E. f. 4 or higher, pressure could not be read; ship near 43 N., 59.5 W., S.E. f. 6, 29.32, rain; ship near 42 N., 63 W. N. f. 6 or higher; center placed 42.5 N., 60.7 W. Sept. 19, extratropical low placed 54 N., 46.5 W. (Historical Weather Maps, Sept. 1908). Author's note: Wind forces (f) are on Beaufort scale and pressures are in inches. 3) Belen College Observatory, Sept. 10. At 9 A.M. today we have sent to Washington the following cablegram: "Perturbation passed early this morning N. of St. Thomas on a course towards the Bahamas" (Diario de la Marina, Havana, Sept. 11, 1908, morning edition, p.4, col.3). 4)

National Meteorological Observatory, Sept. 10, 1:30 P.M. The following cablegram was received from the Weather Bureau: "There is a perturbation to the N. of Puerto Rico, moving to the N.W. The barometer at the capital of that island is 29.74 inches with a moderate S.W. wind" (Diario de la Marina, Havana, Sept. 11, 1908, morning edition, p.4, col.3). 5) Washington, Sept. 11. The center of the tropical hurricane was reported this morning in the vicinity of Turks Is. and was then moving N.E. (it should read N.W.). It is considered dangerous for vessels in that region during the next 2 or 3 days (The New York Times, Sept. 12, 1908, p.9, col.7). 6) National Meteorological Observatory, Sept. 11, 2 P.M. A cablegram received from the Weather Bureau stated that at 1:15 P.M. the hurricane center was W. of Turks Islands, moving to the N.W. At 8 P.M., the Observatory gave to this newspaper, via telephone, the following data: Santiago de Cuba, 3 P.M. (Sept. 11). Barometer 29.76 inches, wind N.W. 6.3 meters per second or about 14 mph (Diario de la Marina, Havana, Sept. 12, 1908, morning edition, p.4, col.3). 7) Belen College Observatory, Sept. 12. Yesterday (Sept. 11) at 1 P.M. we sent to New York a message announcing that the center of the cyclone was to the N.E. and near Great Inagua; the sad news that is published in the cable section of the local press this morning agrees with that forecast (Diario de la Marina, Havana, Sept. 12, 1908, evening edition, p.4, col.6). 8) Belen College Observatory, Sept. 12, 6 P.M. The center of the cyclone was to the N.E. and near Nuevitas at 2 P.M. and we have sent that information, via cable, to the Weather Bureau of Washington and some of our provinces. By 5:30 P.M. it had moved a little to the W., and between tonight and tomorrow its influence will commence along the coast of the 4 westernmost provinces. Washington announced at 3:30 P.M. that hurricane signals were placed at Key West and Jupiter (Diario de la Marina, Havana, Sept. 13, 1908, morning edition, p.4, col.3). Author's note: The center of the cyclone proved to be not as close to the Cuban coast as stated in the bulletin above. 9) Belen College Observatory, Sept. 14, 11 A.M. According to our advisory given to the local press Sept. 12 6 P.M. the center was at 2 P.M. (that day) to the N.E. and near Nuevitas. At 8 A.M. Sept. 13, the center was between Nuevitas and the island of "Espiritu Santo" (one of the Bahamas). At 6 A.M. this morning we have sent to Washington a special cablegram placing the center of the cyclone to the W. of Andros Island. Today the hurricane is moving faster than during the two previous days and is moving away from us (Diario de la Marina, Havana, Sept. 14, 1908, evening edition, p.4, col.1). Author's note: The location given is too far to the W. because, in reality, the hurricane had already recurved to the E. of Nassau by Sept. 14, in accordance to ship data in item 2). 10) Washington, Sept. 14. The tropical storm has apparently recurved northward over the western Bahamas (The New York Times, Sept. 15, 1908, p.12, col.6). Author's note: Actually, the storm had already recurved over the central Bahamas, to the E. of Nassau, in accordance with ship data in item 2). 11) Washington, Sept. 15. There were high N.E. winds on the Virginia and North Carolina coast Monday night and Tuesday (Sept. 14-15) due to the tropical storm which have passed N.E. off the Atlantic coast (The New York Times, Sept. 16, 1908, p.11, col.7). 12) Grand Turk Is., Sept. 11. The hurricane reached here at 9 P.M. last night. At 4 A.M. this morning the hurricane had reached nearly 100 mph and was blowing from the N.E. Much damage has been done to property here and the streets are today a mass of wreckage. The sloop "Telegraph", which had taken shelter at Hawks Nest, foundered with all hands (The New York Times, Sept. 12, 1908, p.4, col.3). 13) San Juan, P.R., Sept. 15. The steamer "Arcadia" has arrived here from New Orleans in a damaged condition from the effect of the hurricane which she encountered 10 miles off Turks Is. Capt. Griffiths said that the "Arcadia" ran into the storm the night of Sept. 10 (The New York Times, Sept. 16, 1908, p.1, col.6). 14) The "Orinoco" left Kingston, Jamaica, Sept. 12 at 8 A.M. On Sunday (Sept. 13),

about 5 P.M. the wind began to blow from the S. until 2 A.M. Sept. 14 when it was blowing a gale (The New York Times, Sept. 19, 1908, p.18, col.1). 15) For 8 hours the "Pretoria" was buffeted by the wind which tried to strip her. The "El Siglo" encountered the gale between Jupiter and Hatteras. The "Mineola" on Sept. 15-16 spent 48 hours running before the gale (The New York Times, Sept. 19, 1908, p.18, col.1). 16) Colon (Panama), Sept. 18. The "Colon" left New York on Sept. 10. She encountered the hurricane at a point 40 miles N. of Watling (San Salvador). The wind blew 100 mph and tremendous seas were soon sweeping over the vessel (The New York Times, Sept. 19, p.18, cols.1-2). Author's note: News about the encounter of the "Colon" with the hurricane were also published in *Diario de la Marina*, Havana, Sept. 19, 1908, morning edition, p.1, col.2. 17) The liner "Siberia" got in yesterday bringing first news of the practical destruction of Mathewtown (Great Inagua). by the hurricane on Sept 13 (it should read Sept. 11). She was lying there when the storm reached its greatest fury. "It was impossible for us to make out what houses had been destroyed but a long continued storm would result in the destruction of all property along the coast. There was no sign of life that we could see, and it is probable that the inhabitants had fled to the open". Four times the course was changed to avoid the fury of the storm (The New York Times, Sept. 20, 1908, part 2, p.7, col.5). 18) The "Parima" left St. Thomas on Sept. 12. The storm struck her on Tuesday afternoon (Sept. 15). It (the wind) came from the S. and around to the N.W. At 4 o'clock Tuesday night (probably 4 A.M. Sept. 16) the storm moderated (The New York Times, Sept. 20, 1908, part 2, p.7, cols.6-7). 19) Nassau, Sept. 22. Long Island was swept by the seas and inundated, the vegetation was destroyed, houses swept away and people today are living in caves. No authentic reports have been received from other islands (The New York Times, Sept. 23, 1908, p.4, col.5). Author's note: Similar information was also published in *Diario de la Marina*, Havana, Sept. 23, 1908, morning edition, p.1, col.3). 20) New York, Sept. 20. The steamer "Prinz Willem" has arrived here bringing the crew of the "Yumuri" which was picked up as Castle Island. Capt. Engebretsen and 14 sailors described the hard time they went through when their vessel was lost and, in addition, the horrible damage caused by the cyclone in the Bahamas (*Diario de la Marina*, Havana, Sept. 21, 1908, evening edition, p.4, col.5). 21) Nassau, Sept. 24. Long Island is the only one for which all coherent reports have been received. There the gale blew for two days with excessive fury, Clarence Town having only 5 houses left standing. There is no doubt that the loss of life is very heavy and that the country side even as far as Cat Island is scalded and burned, and that at the islands which got the full force of the gale not a trace of green vegetation is to be found (The New York Times, Sept. 29, 1908, p.4, col.5). 22) Sept. 12-14, 1908. A cyclone in the Bahama Channel was felt with some force on the northern coast of eastern Cuba. There was damage to vessels and inland (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza which is included in Sarasola (1928). 23) Map showing a partial track for the storm. The track was started in the morning of Sept. 11 near Turks Is., it had the storm recurved just to the E. of Nassau on Sept. 14 and then moved to the N.E.; the last position shown was in the morning of Sept. 18 to the S. of the Canadian Maritime Provinces (Monthly Weather Review, Sept. 1908). 24) A storm was first observed near 12 N., 60 W. on Sept. 8, 1908 and lasted 12 days; it recurved near 24 N., 77 W. and it was last observed near 57 N., 40 W. (Mitchell, 1924). Author's note: A track shown in Tannehill (1938) was found to be quite similar to the corresponding track for this storm in Mitchell (1924). Except for the period Sept. 7-9 during which the track in Neumann et al. (1993) was much farther N. than the one in Mitchell (1924), the two tracks just mentioned showed some similarities.

On the basis of information contained in the above items, the author of this study